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(54) APPARATUS AND METHOD FOR PICTURE DISPLAY

(57)Abstract:

PROBLEM TO BE SOLVED: To prevent a picture from being reduced, even if input video signals are side panel signals or letter box signals in a plurality of pictures display or the utilization efficiency of a screen from lowering due to display of useless picture portions in a reduced picture display.

SOLUTION: Whether an input video signal is a side panel signal, a letter box signal or a full-line signal is detected. If the input video signal is a side panel signal or a letter box signal in a plurality of picture display or a reduced picture display, only signals for effective picture regions are cut out and composited into a picture of an adjusted picture size. This prevents the picture from being reduced, even if the input video signals are side panel signals or letter box signals for a plurality of pictures display, or improves the utilization efficiency of a screen, without display-processing of useless picture portions in a reduced picture display.

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CLAIMS

[Claim(s)]

[Claim 1] With a decision means to judge whether an input video signal is a signal with which the non-image part was added to the perimeter of an effective image field, and the above-mentioned decision means When the above-mentioned input video signal is judged to be the signal with which the non-image part was added to the perimeter of an effective image field The image display device equipped with an image-processing means to start the signal of the above-mentioned effective image field of the above-mentioned input video signals, to adjust drawing size using the signal of the above-mentioned effective image field, and to perform image composition.

[Claim 2] The above-mentioned image-processing means is an image processing system according to claim 1 which is what performs two or more image display processing which adjusts each drawing size of two or more input video signals, and compounds the screen based on the input video signal of the above-mentioned two or more networks on a background screen.

[Claim 3] The above-mentioned image-processing means is an image processing system according to claim 1 which is what performs contraction image display processing which reduces each drawing size of an input video signal, and is compounded on a background screen.

[Claim 4] The above-mentioned decision means is the image processing system according to claim 1 which judged whether the above-mentioned input video signal was a signal with which the non-image part was added to the perimeter of an effective image field from the information on an interface that the above-mentioned

input video signal is inputted.

[Claim 5] The above-mentioned decision means is the image processing system according to claim 1 which judged whether the above-mentioned input video signal was a signal with which the non-image part was added to the perimeter of an effective image field from the information superimposed or added to the above-mentioned input video signal.

[Claim 6] The above-mentioned decision means is the image processing system according to claim 1 which detects the non-signal part of the above-mentioned input video signal, and judged whether the above-mentioned input video signal was a signal with which the non-image part was added to the perimeter of an effective image field.

[Claim 7] The above-mentioned decision means is the image processing system according to claim 1 which judged whether the above-mentioned input video signal was a signal with which the non-image part was added to the perimeter of an effective image field from the information sent into a transport stream.

[Claim 8] It judges whether an input video signal is a signal with which the non-image part was added to the perimeter of an effective image field. When the above-mentioned input video signal is judged to be the signal with which the non-image part was added to the perimeter of an effective image field The image display approach which starts the signal of the above-mentioned effective image field of the above-mentioned input video signals, adjusts drawing size using the signal of the above-mentioned effective image field, and was made to perform image composition.

[Claim 9] The above-mentioned image composition is the image-processing approach according to claim 8 which is what adjusts each drawing size of the above-mentioned input video signal, and compounds the screen based on the input video signal of the above-mentioned two or more networks on a background screen.

[Claim 10] The above-mentioned image composition is the image-processing approach according to claim 8 which is what reduces each drawing size of the above-mentioned input video signal, and is compounded on a background screen.

[Claim 11] Decision whether the above-mentioned input video signal is a signal with which the non-image part was added to the perimeter of an effective image field is the image-processing approach according to claim 8 which was made to perform using the information on an interface that the above-mentioned input video signal is inputted.

[Claim 12] Decision whether the above-mentioned input video signal is a signal with which the non-image part was added to the perimeter of an effective image field is the image-processing approach according to claim 8 which was made to perform using the information superimposed or added to the above-mentioned input video signal.

[Claim 13] Decision whether the above-mentioned input video signal is a signal with which the non-image part was added to the perimeter of an effective image field is the image-processing approach according to claim 8 which was made to perform by

detecting the non-signal part of the above-mentioned input video signal, and judging whether the above-mentioned input video signal is a signal with which the non-image part was added to the perimeter of an effective image field.

[Claim 14] Decision whether the above-mentioned input video signal is a signal with which the non-image part was added to the perimeter of an effective image field is the image-processing approach according to claim 8 which was made to perform using the information sent into a transport stream.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention is used for the television receiver which can perform two or more image display which displays two or more images side by side on a background screen, and contraction image display which reduces an image and is displayed with onscreen images, such as a text, and relates to a suitable image processing system and a suitable approach.

[0002]

[Description of the Prior Art] The television receiver which can perform two or more image display which displays two or more images side by side on a background screen, and contraction image display which reduces an image and is displayed with onscreen images, such as a text, is known. Drawing 12 shows an example of the display in such a television receiver.

[0003] In drawing 12, two or more video signals are inputted into the input signal selection section 101 from input terminals 102A and 102B and --. In the input signal selection section 101, two video signals which should be displayed on a screen are chosen from input terminals 102A and 102B and the video signal from --.

[0004] Two selected video signals are supplied to A/D converters 103A and 103B. By A/D converters 103A and 103B, two video signals chosen in the input signal selection section 101 are digitized. Two video signals digitized by A/D converters 103A and 103B are supplied to the image-processing section 104.

[0005] In the image-processing section 104, two or more image display processing and contraction image display processing are performed. In order to realize such an image processing, an image memory 105 is established in the image-processing section 104.

[0006] For example, when performing 2 image display, two inputted video signals are written in an image memory 105, and to desired timing, two video signals are read from this image memory 105, and it is arranged on a background screen. At this time,

adjustment of drawing size is performed by performing infanticide and interpolation.

[0007] The output of the image-processing section 104 is supplied to D/A converter 106. The output of the image-processing section 104 is changed into an analog signal by D/A converter 106. The output of this D/A converter 106 is supplied to CRT display 107.

[0008]

[Problem(s) to be Solved by the Invention] By the way, there is a case of the signal containing a non-image part in input terminals 102A and 102B and the video signal supplied to -- like a letter box signal or a side panel signal.

[0009] That is, as a format of a video signal, the thing of (720x480), the thing of (1280x720), and the thing of (1920x1080) have the number of effective pixels.

[0010] The number of effective pixels serves as a field angle of the standard screen of (4:3) in a format of (720x480). In a format of a format (1920x1080) of (1280x720), the number of effective pixels serves as a field angle of the wide screen of (16:9).

[0011] By 16:9, as shown in drawing 13 A, when the aspect ratio of an effective image field is 4:3, a field angle adds a black non-image part to right and left, and is setting the field angle to 16:9. Thus, the signal with which the aspect ratio of an effective image field added the black non-image part to right and left by 4:3, and set the field angle to 16:9 is called the side panel signal.

[0012] Moreover, by 4:3, as shown in drawing 13 B, when the aspect ratio of an effective image field is 16:9, a field angle adds a black non-image part up and down, and is setting the field angle to 4:3. Thus, the signal with which the aspect ratio of an effective image field added the black non-image part up and down, and set the field angle to 4:3 by 16:9 is called the letter box signal.

[0013] As shown in drawing 13 A, in the case of a side panel signal, there is a non-image part at right and left, and as shown in drawing 13 B, in the case of a letter box signal, there is a non-image part up and down. Write the inputted video signal in an image memory 105 as mentioned above, and to for this reason, the suitable timing according to the location of a screen When it reads and the image processing is performed, carrying out drawing size adjustment so that it may become predetermined drawing size, the video signal inputted in the case of a letter box signal or a side panel signal When an image processing will be carried out, it will be displayed also about a non-image part and two or more image display processing is carried out, the image of a side panel signal or a letter box signal becomes small, or When contraction image display processing is carried out, the problem of it becoming impossible for the viewing area on a screen to use effectively arises.

[0014] That is, drawing 14 performs 2 image display from the image of a side panel signal, and the image of a full line signal, and is an example of a display at the time.

[0015] As shown in drawing 14 A, as for the side panel signal S101, all images including a non-image part on either side are written in an image memory. And in the magnitude of all images, drawing size is adjusted, and the video signal written in this

image memory is read from an image memory, and is displayed. As shown in drawing 13 B, all images are written in an image memory, drawing size is adjusted in the magnitude of all images, and the full line signal S102 is read from an image memory, and is displayed on a background screen. Thereby, as shown in drawing 13 C, 2 image display which consists of an image G101 formed from the side panel signal S101 and an image G102 formed from the full line signal S102 is made.

[0016] As shown in drawing 14 A and drawing 14 B, the aspect ratio of an effective image field is (4:3), and, originally, as for both these two signals S101 and S102, the image of the same magnitude should be displayed. However, if two images G101 and G102 are displayed side by side as shown in drawing 14 C, the image G101 formed from the side panel signal S101 will become small compared with the part to which a non-image part exists in right and left, and the image G102 formed from the full line signal S102.

[0017] Moreover, drawing 15 is the example which reduced area and displayed the side panel signal S111 to the display screen. As shown in drawing 15 A, as for the side panel signal S111, all images including a non-image part on either side are written in an image memory. And drawing size is adjusted in the magnitude of all images, and the video signal written in this image memory is read from an image memory, and is displayed on a background screen. As shown in drawing 15 B, the image G112 of ONSUKURIN, such as a text, is displayed with the image G111 formed from this side panel signal.

[0018] In this case, since a non-image part on either side exists in the side panel signal S111, that part and a part useless in the contraction image G111 arise. For this reason, the area which displays the image G112 of onscreen displays, such as that part and other texts, will become small, and the use effectiveness of a screen will fall.

[0019] Therefore, the purpose of this invention is to offer the image display device and approach of display processing of the useless image part being carried out, and having made it the use effectiveness of a screen not fall, in case an image does not become small and carries out contraction image display, even if input video signals are a side panel signal and a letter box signal, in case two or more image display is carried out.

[0020]

[Means for Solving the Problem] Invention of claim 1 with a decision means by which an input video signal judges whether it is the signal with which the non-image part was added to the perimeter of an effective image field, and a decision means When an input video signal is judged to be the signal with which the non-image part was added to the perimeter of an effective image field It is the image display device equipped with an image-processing means to start the signal of the effective image field of the input video signals, to adjust drawing size using the signal of an effective image field, and to perform image composition.

[0021] Invention of claim 8 judges whether an input video signal is a signal with which

the non-image part was added to the perimeter of an effective image field. When an input video signal is judged to be the signal with which the non-image part was added to the perimeter of an effective image field, it is the image display approach which starts the signal of the effective image field of the input video signals, adjusts drawing size using the signal of an effective image field, and was made to perform image composition.

[0022] It is judged whether it is the video signal with which an input video signal contains a non-image part like a side panel signal or a letter box signal. And if input video signals are a side panel signal and a letter box signal in case two or more image display and contraction image display are performed, only the video signal of an effective image field is started and read from an image memory, and it is displayed on a background screen. Thereby, in case two or more image display processing is performed, even if input video signals are a side panel signal and a letter box signal, it is lost that a display image becomes small. Moreover, when contraction image display is performed, a viewing area can be used effectively.

[0023]

[Embodiment of the Invention] Hereafter, the gestalt of implementation of this invention is explained with reference to a drawing. Drawing 1 shows an example of the image display device with which this invention was applied.

[0024] In drawing 1, 1 is an interface for inputting a video signal. Two or more video signals are supplied to an interface 1.

[0025] As an image format of a video signal, the thing of (720x480), the thing of (1280x720), and the thing of (1920x1080) have the number of effective pixels. The number of effective pixels serves as a field angle of the standard screen of (4:3) in a format of (720x480). In a format of a format (1920x1080) of (1280x720), the number of effective pixels serves as a field angle of the wide screen of (16:9). Moreover, there are a thing of the format to which the number of effective pixels performs interlaced scanning to each of (720x480), (1280x720), and (1920x1080), and a thing of the format scanned sequentially. Furthermore, the thing of (4:3) and the thing of (16:9) have the aspect ratio of an image field.

[0026] As an interface 1, a switch terminal, D terminal, a component terminal, etc. are used.

[0027] D terminal was standardized corresponding to digital broadcast, and the component signal of (Y, Pb, Pr) and the signal for identifying an image format are transmitted with D terminal. According to the broadcast type, five kinds of things are prepared for D terminal from D1 to D5.

[0028] A switch terminal separates and inputs a luminance signal and a chroma signal. Three terminals are used in order that a component terminal may input each component signal. Moreover, a switch terminal is used for standard television (480i), and the component terminal using three terminals is used for HDTV (1080i).

[0029] The connection ID detecting element 4 is formed in an interface 1. This

connection ID detecting element 4 is for detecting the image format of a video signal by which an input terminal is carried out.

[0030] When a video signal is inputted using D terminal or a switch terminal, an image format of the video signal inputted can judge from the output of an interface 1. The output of the connection ID detecting element 4 is supplied to a microprocessor 5. By the microprocessor 5, an image format of the video signal inputted is judged from the output of the connection ID detecting element 4.

[0031] The video signal from an interface 1 is supplied to the input signal selection section 2. The input signal selection section 2 chooses two video signals which should project on a screen from the video signal inputted through an interface 1.

[0032] Two video signals chosen in the input signal selection section 2 are supplied to A/D converters 6A and 6B. By A/D converters 6A and 6B, two video signals chosen in the input signal selection section 2 are digitized. The output of A/D converters 6A and 6B is supplied to the image-processing section 7.

[0033] Moreover, two video signals chosen in the input signal selection section 2 are supplied to the additional information detecting element 8. The additional information detecting element 8 detects the additional information on which the signal itself is added or overlapped, and judges an image format of an input video signal. For example, by the EDTV-IIID signal and ID-1 signal, it is superimposed on the aspect ratio and field angle information on an image as additional information. The additional information on which it is the additional information detecting element 8, and the signal is added or overlapped in this way is detected. This additional information is supplied to a microprocessor 5. By the microprocessor 5, an image format of an input video signal is judged from the additional information detected by the additional information detecting element 8.

[0034] From the output of the connection ID detecting element 4, an image format of the video signal inputted based on the information on an interface 1 is judged.

Moreover, an image format of the video signal inputted is judged by the additional information detecting element 8 from the additional information on which the inputted video signal is added or overlapped. Thus, from the judged image format, it is judged whether input video signals are a side panel signal and a letter box signal or it is a full line signal.

[0035] Furthermore, two video signals chosen in the input selection section 2 are supplied to the non-signal detecting element 9. The level of an input signal and predetermined level are compared by the non-signal detecting element 9. The output of the non-signal detecting element 9 is supplied to a microprocessor 5. By the microprocessor 5, effective image area size is detected from this comparison output, and when horizontally small, it is judged as a side panel signal, and an effective image field is judged to be a letter pock signal, when an effective image field is perpendicularly small.

[0036] The information on whether input video signals are a letter box signal and a

side panel signal is used, when performing two or more image display processing and contraction image display processing so that it may explain later.

[0037] The image-processing section 7 is performing processing for arranging the image based on two video signals chosen in the input signal selection section 2 in the suitable location on a background screen. Moreover, this image-processing section 7 is performing processing on which onscreen images, such as a text, are displayed while displaying it on a background screen among the inputted signals by using the image based on one video signal as a contraction image.

[0038] The output of the image-processing section 7 is supplied to D/A converter 12. The output of the image-processing section 7 is changed into an analog signal by D/A converter 12. The output of this D/A converter 12 is supplied to CRT display 13.

[0039] As mentioned above, the image-processing section 7 is performing two or more image display processing and contraction image display processing.

Fundamentally, these processings are realized by reading and carrying out drawing size adjustment, writing an input video signal in an image memory 11, and thinning out the video signal of this image memory 11 to predetermined timing, or interpolating.

[0040] For example, in two or more image display processing, two video signals chosen in the input signal selection section 2 are written in an image memory 11. And two video signals written in this image memory 11 are the suitable timing according to the display position of an image, they are thinned out so that it may become predetermined drawing size, are read, interpolating, and are compounded on a background screen.

[0041] By the way, there is a case of the side panel signal with which the aspect ratio of an effective image field added the black non-image part to right and left by (4:3), and the video signal inputted set the field angle to 16:9, and the letter box signal with which the aspect ratio of an effective image field added the black non-image part up and down by (16:9), and set the field angle to (4:3). There is a non-image part in a side panel signal or a letter box signal. For this reason, the inputted video signal is written in an image memory 11 as mentioned above, and if it reads adjusting so that it may become predetermined drawing size and the image processing is performed to the suitable timing according to the location of a screen, in the case of a side panel signal or a letter box signal, display processing of the video signal inputted will be carried out also about a non-image part.

[0042] Then, with the gestalt of implementation of this invention, it judges whether the selected video signals are a side panel signal and a letter box signal by the microprocessor 5, and when the selected video signals are a side panel signal and a letter box signal, in case two or more image display processing and contraction image display processing are performed, only the video signal of an effective image field is started and it is made to carry out a display process out of the video signal accumulated in the screen memory 11.

[0043] that is, one screen of a video signal inputted into an image memory 11 as

shown in drawing 2 A and drawing 2 B -- corresponding -- horizontal address $x_a - x_b$ Vertical address $y_a - y_b$ from -- the becoming room is prepared. the video signal inputted -- one screen -- corresponding -- this horizontal address $x_a - x_b$ And vertical address $y_a - y_b$ from -- it is written in the becoming room.

[0044] if the inputted video signal is a full line signal -- horizontal address $x_a - x_b$ Vertical address $y_a - y_b$ from -- all the video signals written in the becoming room become the thing of an effective image.

[0045] on the other hand, when the inputted video signal is a side panel signal Horizontal address $x_c - x_d$ among the video signals of one screen written in an image memory 11 as shown in drawing 2 A Vertical address $y_a - y_b$ The surrounded part in an effective image field Horizontal address $x_a - x_c$ Vertical address $y_a - y_b$ The surrounded part and horizontal address $x_d - x_b$ Vertical address $y_a - y_b$ The surrounded part turns into a non-image part.

[0046] moreover, when the inputted video signal is a letter box signal Horizontal address $x_a - x_b$ among the video signals of one screen written in an image memory 11 as shown in drawing 2 B The vertical address $y_c - y_d$ The surrounded part in an effective image field Horizontal address $x_a - x_b$ Vertical address $y_a - y_c$ The surrounded part and horizontal address $x_a - x_b$ Vertical $y_d - y_b$ The surrounded part turns into a non-image part.

[0047] Then, horizontal address $x_c - x_d$ among the video signals of one screen written in an image memory 11 as shown in drawing 2 A when the video signal inputted when performing two or more image display processing and contraction image display processing is a side panel signal Vertical address $y_a - y_b$ Only the video signal of the effective image field surrounded is started and displayed. When the inputted video signal is a letter box signal, as it is shown in drawing 2 B, it is horizontal address $x_a - x_b$. The vertical address $y_c - y_d$ Only the video signal of the effective image field surrounded is started and displayed.

[0048] Thus, it can prevent that a part useless when the image formed from the side-panel signal or the letter box signal on the occasion of two or more image-display processing becomes small or contraction image display is carried out is displayed, and it becomes impossible to use a screen effectively by starting and displaying only the video signal of an effective image field when the inputted video signals are a side-panel signal and a letter box signal, in case two or more image-display processing and contraction image-display processing are performed.

[0049] It is detectable whether the inputted video signals are a side panel signal and a letter box signal or it is a full line signal with the output of the connection ID detecting element 4, the output of the additional information detecting element 8, and the output of the non-signal detecting element 9, as mentioned above.

[0050] That is, if [whose interface 1 is / like a switch terminal or D terminal], the field angle information and the aspect ratio of an input video signal are obtained from the information on the input interface 1. Moreover, when additional information [like

an EDTV-IIIID signal and ID-1 signal] whose input video signal is the signal on which it is added or superimposed, an aspect ratio and field angle information can be detected from this additional information. The information on an interface 1 is detected by the connection ID detecting element 4, and this detection output is supplied to a microprocessor 5. The additional information on which the input video signal is added or overlapped is detected by the additional information detecting element 8, and is supplied to a microprocessor 5.

[0051] From the information from the connection ID detecting element 4, or the information from the additional information detecting element 8, a microprocessor 5 acquires the field angle information and aspect ratio information on an input video signal, and judges whether input video signals are a side panel signal and a letter box signal or it is a full line signal.

[0052] For example, it is the field angle of (4:3) from the information on the number of pixels, and when the aspect ratio of an effective image field is judged to be (16:9) from the information on an aspect ratio, an effective image field can judge this input signal to be the letter box signal of the image of (16:9) which added the non-image part up and down, and set the field angle to (4:3). Similarly, when it is the field angle of (16:9) from the information on the number of pixels and the aspect ratio of an effective image field is judged to be (4:3) from the information on an aspect ratio, it can be judged that this input signal is a side panel signal with which the effective image field added the non-image part to right and left of the screen of (4:3), and set the field angle to (16:9).

[0053] By the way, the information about an image format of an input video signal may not be acquired from the additional information of an input video signal by the information on an interface 1, either. In this case, by the non-signal detecting element 9, the level of an input signal is compared with predetermined level, effective image area size is detected from this comparison output, and when horizontally small, it is judged as a side panel signal, and an effective image field is judged to be a letter box signal, when an effective image field is perpendicularly small.

[0054] In addition, in this example, it is judged in this way using three information on the information on an interface 1, the information on which the input video signal is added or overlapped, and the detection information on the non-signal part of an input video signal whether input video signals are a side panel signal and a letter box signal or it is a full line signal. Of course, it is not necessary to use information for these [all]. It is sufficient only using the information on an interface, and only the information on which the input video signal is added or overlapped may be used, or only detection information on the non-signal part of an input video signal may be used. About how such information is combined or to which information priority is given, it is decided in consideration of an operating environment, cost, the engine performance, etc.

[0055] Thus, in case two or more image display processing and contraction image

display processing are performed, when the inputted video signals are a side panel signal and a letter box signal, by starting and displaying only the video signal of an effective image field, as shown below, even if it is a side panel signal and a letter box signal, a display does not become small, and the viewing area on a screen can use effectively.

[0056] Drawing 3 is an example of a display when performing two or more image display (2 image display). In this example, one side is made into the side panel signal S1 between two selected input video signals, and another side is made into the full line signal S2.

[0057] As shown in drawing 3 A, as for the side panel signal S1, all images including a non-image part on either side are written in an image memory. And out of the video signal written in this image memory, the thing of an effective image field is started, and drawing size is adjusted, and in an effective image field, it is read from an image memory and displayed. On the other hand, as shown in drawing 3 B, all images are written in an image memory, drawing size is adjusted in the magnitude of all images, and the full line signal S2 is read from an image memory, and is displayed on a background screen. Thereby, as shown in drawing 3 C, 2 image display which consists of an image G1 formed from the side panel signal and an image G2 formed from the full line signal is made.

[0058] As shown in drawing 3 C, in the case of the side panel signal S1, this example enables it to make the same magnitude of the image G2 formed from the full line signal S2 in the magnitude of the image G1 formed from the side panel signal S1 by starting only an effective image field.

[0059] Drawing 4 is the example of a display of contraction image display, when an input signal is a side panel signal. As shown in drawing 4 A, as for the side panel signal S11, all images including a non-image part on either side are written in an image memory. And out of the video signal written in this image memory, the thing of an effective image field is started, drawing size is adjusted in an effective image field, and it is read from an image memory, and is displayed on a background screen. As shown in drawing 4 B, the onscreen images G12, such as a text, are displayed with the image G11 formed from this side panel signal.

[0060] When an input signal is a side panel signal in case contraction image display is performed as shown in drawing 4 B, the video signal of an effective image field is started and displayed out of the video signal written in screen memory. this spreads horizontally in the contraction image G11 formed from the side panel signal S11 -- a useless part is excluded and the onscreen images G12, such as a text, can be displayed efficiently.

[0061] The input signal of drawing 5 is the example of a display of the contraction image display of a letter box signal. As shown in drawing 5 A, as for the letter box signal S21, all images including an up-and-down non-image part are written in an image memory. And out of the video signal written in this image memory, the thing of

an effective image field is started, drawing size is adjusted in an effective image field, and it is read from an image memory, and is displayed on a background screen. As shown in drawing 5 B, the onscreen images G22, such as a text, are displayed with the image G21 formed from this side panel signal S21.

[0062] When an input signal is the letter box signal S21 in case contraction image display is performed as shown in drawing 5 B, the video signal of an effective image field is started and displayed out of the video signal written in screen memory. The useless part which spreads perpendicularly by this in the contraction image G21 formed from the letter box signal S21 is excluded, and the onscreen images G22, such as a text, can be displayed efficiently.

[0063] In addition, in explanation to ****, as an example of two or more image display processing, although 2 image display is performed, of course, many screens can also be displayed further.

[0064] For example, drawing 6 is the example which performed 3 image display as two or more image display. In this example, as shown in drawing 6 A, as for the side panel signal S31, all images including a non-image part on either side are written in an image memory. And out of the video signal written in this image memory, the thing of an effective image field is started, drawing size is adjusted in an effective image field, and it is read from an image memory.

[0065] As for the letter box signal S32, all images including an up-and-down non-image part are written in an image memory. And out of the video signal written in this image memory, the thing of an effective image field is started, and drawing size is adjusted, and in an effective image field, it is read from an image memory and displayed.

[0066] As for the letter box signal S33, all images including an up-and-down non-image part are written in an image memory. And out of the video signal written in this image memory, the thing of an effective image field is started, and drawing size is adjusted, and in an effective image field, it is read from an image memory and displayed.

[0067] Thereby, as shown in drawing 6 D, three images which consist of the images G31 formed from the side panel signal S31, images G32 formed from the letter box signal S32, and images G33 formed from the letter box signal S33 are displayed together with a background screen top.

[0068] In addition, if an input video signal is that of a side panel signal or a letter box signal in case the video signal of a whole image is written in the image memory 11 and two or more image display processing and contraction image display processing are performed in explanation to **** Although only the thing of an effective image field is read and the effective image field is started If an input video signal is that of a side panel signal or a letter box signal, only the thing of an effective image field is written in an image memory, an input video signal is read from an image memory, and it may be made to start an effective image field.

[0069] Drawing 7 shows the gestalt of other operations of this invention. This example enables it to display the receiving image of the digital satellite broadcasting service based on MPEG(Moving Picture Coding Experts Group) 2 method in addition to two video signals chosen in the above-mentioned input signal selection section 2. In addition, in drawing 7, about the same component as drawing 1, the same sign is attached and the explanation is omitted.

[0070] In drawing 7, the intermediate frequency signal of digital satellite broadcasting service is supplied to an input terminal 20. For example, if it is digital BS (Broadcast Satellite) broadcast, it will be received by the parabolic antenna (not shown), and the electric wave from the satellite sent with the 12GHz band will be changed into intermediate frequency signal BS-IF of BS broadcast by LNB (Low Noise Block Down Converter) attached in the parabolic antenna, and will be supplied to an input terminal 20. If it is digital CS (Communication Satellite) broadcast, it will be changed into intermediate frequency signal CS-IF of CS broadcasting, and an input terminal 20 will be supplied.

[0071] The signal from an input terminal 20 is supplied to a front end 21. By the front end 21, an input signal gets over and the transport stream of MPEG 2 is outputted. The transport stream to which it is restored by the front end 21 is supplied to a demultiplexer 22. By the demultiplexer 22, a packet is separated based on PID. The output of this demultiplexer 22 is supplied to the MPEG 2 video decoder 24.

[0072] By the MPEG 2 video decoder 24, expanding processing of the video signal of an MPEG 2 method gets used, and a video signal is decoded. The video signal decoded by the MPEG 2 video decoder 24 is supplied to the image-processing section 7.

[0073] Moreover, in this example, in order to enable it to decode the transport stream of MPEG 2 sent by another media from the outside, the input terminal 23 is formed. Moreover, in order to enable it to decode the video signal of MPEG 2 sent by another media from the outside, the input terminal 25 is formed.

[0074] Thus, the transport stream of MPEG 2 is decoded in this example. This decoded video signal is sent to the image-processing section 7.

[0075] In the image-processing section 7, two or more image display processing and contraction image display processing are performed to the video signal decoded by the MPEG 2 video decoder 24 with the video signal chosen in the input signal selection section 2.

[0076] As mentioned above, in case two or more image display processing and contraction image display processing are carried out, processing whose input video signal starts and displays only an effective image field in the case of a side panel signal or a letter box signal is performed.

[0077] In the example to the above-mentioned, decision whether input video signals are a side panel signal and a letter box signal or it is a full line signal. The information on an interface 1, Although judged using the information on which the input video

signal is added or overlapped, and the detection information on the non-signal part of an input video signal When an input video signal is a decoding signal of MPEG 2, it can judge whether input video signals are a side panel signal and a letter box signal using the information sent by the transport stream of MPEG 2.

[0078] That is, it is transmitted by the MPEG 2 system and the aspect ratio and field angle of a slack image are Sequence_Header and Sequence_Display_Extension. It can specify.

[0079] For example, in the BS-digital-broadcasting system, horizontal Sais of the whole image is specified by Horizontal_Size_Value (HSV) in Sequence_Header, the size of the perpendicular direction of the whole image is specified by Vertical_Size_Value (VSV), and the image aspect ratio of an effective image field is specified by Aspect_Ratio_Infomation (ARI).

[0080] Moreover, Sequence_Display_Extension The horizontal size of the amount of effective images is specified by inner Display_Horizontal_Size (DHS), and the size of the perpendicular direction of an effective image field is specified by Display_Vertical_Size (DVS).

[0081] Therefore, if it is a full line signal, Horizontal_Size_Value (HSV) and Display_Horizontal_Size (DHS) are in agreement, and Vertical_Size_Value (VSV) and Display_Vertical_Size (DVS) are in agreement.

[0082] If it is a letter box signal, Horizontal_Size_Value (HSV) and Display_Horizontal_Size (DHS) are in agreement, and Display_Vertical_Size (DVS) becomes small to Vertical_Size_Value (VSV).

[0083] If it is a side panel signal, Display_Horizontal_Size (DHS) becomes small to Horizontal_Size_Value (HSV), and Vertical_Size_Value (VSV) and Display_Vertical_Size (DVS) are in agreement.

[0084] Thus, if the value of Horizontal_Size_Value (HSV) is compared with the value of Display_Horizontal_Size (DHS) and the value of Vertical_Size_Value (VSV) is compared with the value of Display_Vertical_Size (DVS), it can judge whether it is a full line signal, it is a side panel signal, or it is a letter box signal from the comparison output. Furthermore, effective image area size can be judged by Horizontal_Size (DHS) and Display_Vertical_Size (DVS).

[0085] Therefore, what is necessary will be to compare Horizontal_Size_Value (HSV) with Display_Horizontal_Size (DHS), to compare Vertical_Size_Value (VSV) and Display_Vertical_Size (DVS) with the case of the video of MPEG 2, and just to perform processing which cuts down a screen based on the parameter of the smaller one.

[0086] Thus, the example of a display when the video signal decoded by the MPEG 2 decoder 24 with the video signal chosen in the input signal selection section 2 is supplied to the image-processing section 7 is shown below.

[0087] Drawing 8 is the example of a display of two or more image display in case two selected input video signals are letter box signals and the video signal decoded by MPEG 2 is a side panel signal.

[0088] As shown in drawing 8 B and drawing 8 C, as for two selected letter box signals S42 and S43, all images including an up-and-down non-image part are written in an image memory. And out of the video signal written in this image memory, the thing of an effective image field is started, drawing size is adjusted in an effective image field, and it is read from an image memory, and is displayed on a background screen.

[0089] As shown in drawing 8 A, as for the side panel signal S41 decoded by MPEG 2, all images including an up-and-down non-image part are written in an image memory. And Horizontal_Size_Value (HSV) is compared with Display_Horizontal_Size (DHS), Vertical_Size_Value (VSV) is compared with Display_Vertical_Size (DVS), the video signal written in the image memory is started based on the parameter of the smaller one, and it is displayed on a background screen.

[0090] Thereby, as shown in drawing 8 D, three images which consist of images G41 formed from the side panel signal S41 decoded by MPEG 2 and images G42 and G43 formed from two selected letter box signals S42 and S43 are displayed.

[0091] The video signal which one of two input video signals with which drawing 9 was chosen was a side panel signal, and other one is a letter box signal and was decoded by the MPEG 2 decoder is the example of a display of two or more screen display in the case of being a side panel signal.

[0092] As shown in drawing 9 A, as for side panel 1 [S51] of two selected lines, all images including a non-image part on either side are written in an image memory. And out of the video signal written in this image memory, the thing of an effective image field is started, drawing size is adjusted in an effective image field, and it is read from an image memory, and is displayed on a background screen.

[0093] As shown in drawing 9 C, as for the letter box signal S53 of another side of the two selected lines, all images including an up-and-down non-image part are written in an image memory. And out of the video signal written in this image memory, the thing of an effective image field is started, drawing size is adjusted in an effective image field, and it is read from an image memory, and is displayed on a background screen.

[0094] As shown in drawing 9 B, as for the letter box signal S52 decoded by MPEG 2, all images including an up-and-down non-image part are written in an image memory. And Horizontal_Size_Value (HSV) is compared with Display_Horizontal_Size (DHS), Vertical_Size_Value (VSV) is compared with Display_Vertical_Size (DVS), and the video signal written in the image memory is started based on the parameter of the smaller one.

[0095] The image G51 formed from side panel 1 [S51] of two selected signals by this as shown in drawing 9 D, [0096] as which three images which consist of images G53 formed from other letter box 1 [S53] of the image G52 formed from the letter box signal S52 decoded by MPEG 2 and two signals chosen in the input signal selection section 2 are displayed The decoded video signal is a side panel signal, and

drawing 10 is an example of a display when carrying out contraction image display of this. As shown in drawing 10 A, as for the side panel signal S61 decoded by MPEG 2, all images including a non-image part on either side are written in an image memory. And Horizontal_Size_Value (HSV) is compared with Display_Horizontal_Size (DHS), Vertical_Size_Value (VSV) is compared with Display_Vertical_Size (DVS), and the video signal written in the image memory is started based on the parameter of the smaller one. As shown in drawing 10 B, the onscreen images G62, such as a text, are displayed with the image G61 formed from this letter box signal S61.

[0097] The video signal with which drawing 11 was decoded by the MPEG 2 decoder 24 is a letter box signal, and is an example of a display at the time of carrying out contraction image display of this. As shown in drawing 11 A, as for the letter box signal S71 decoded by the MPEG 2 decoder 24, all images including an up-and-down non-image part are written in an image memory. And Horizontal_Size_Value (HSV) is compared with Display_Horizontal_Size (DHS), Vertical_Size_Value (VSV) is compared with Display_Vertical_Size (DVS), and the video signal written in the image memory is started based on the parameter of the smaller one. As shown in drawing 11 B, the onscreen images G72, such as a text, are displayed with the image G71 formed from this letter box signal.

[0098] As mentioned above, in this invention, in case the video signal inputted carries out two or more image display and contraction image display in the case of a side panel signal or a letter box signal, the signal of an effective image field is started. For this reason, in case two or more image display processing is carried out, even if the side panel signal and the letter box signal are inputted, it is lost that an image becomes small. Moreover, in case contraction image display processing is performed, a useless part is no longer displayed and the display screen can use effectively.

[0099] In addition, although two or more image display processing and contraction image display processing are performed in the image-processing section 7, in the image-processing section 7, it is possible [it] to perform further various processings with an above-mentioned example. For example, the image formed from one side of the video signal chosen in the input signal selection section 2 is used as a parent image, the image formed from the video signal of another side can be reduced, this can be made into a child image, and PinP which inserts in and displays a child image on a parent image can be processed. Also in the case of processing [such] of PinP, about a child image, if only an effective image field is started, a background image can use effectively.

[0100] Moreover, in order for an input video signal to display an image for this on [whole] a screen in the case of a side panel signal or a letter box signal, interpolation processing of a horizontal direction or a perpendicular direction is needed. The image-processing section 7 is performing processing for an input video signal to display this on [whole] a screen in the case of a side panel signal or a letter box signal in this way. For example, in order to display an image on the whole

screen since it becomes a letter box signal when an input video signal is EDTV, processing of the number conversion of Rhine is performed.

[0101]

[Effect of the Invention] According to this invention, it is judged for an input video signal whether they are a side panel signal, a letter box signal, and the video signal that contains a non-image part like. And if input video signals are a letter box signal and a side panel signal in case two or more image display and contraction image display are performed, only an effective image field video signal is started and displayed from an image memory. Thereby, in case two or more image display processing is performed, even if input video signals are a side panel signal and a letter box signal, it is lost that a display image becomes small. Moreover, when contraction image display is performed, a viewing area can be used effectively.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the block diagram of the gestalt of 1 implementation of this invention.

[Drawing 2] It is the approximate line Fig. used for explanation of the gestalt of 1 implementation of this invention.

[Drawing 3] It is the approximate line Fig. showing the example of a display in the gestalt of 1 implementation of this invention.

[Drawing 4] It is the approximate line Fig. showing the example of a display in the gestalt of 1 implementation of this invention.

[Drawing 5] It is the approximate line Fig. showing the example of a display in the gestalt of 1 implementation of this invention.

[Drawing 6] It is the approximate line Fig. showing the example of a display in the gestalt of 1 implementation of this invention.

[Drawing 7] It is the block diagram of the gestalt of other operations of this invention.

[Drawing 8] It is the approximate line Fig. showing the example of a display in the gestalt of other operations of this invention.

[Drawing 9] It is the approximate line Fig. showing the example of a display in the gestalt of other operations of this invention.

[Drawing 10] It is the approximate line Fig. showing the example of a display in the gestalt of other operations of this invention.

[Drawing 11] It is the approximate line Fig. showing the example of a display in the gestalt of other operations of this invention.

[Drawing 12] It is the block diagram of an example of the conventional image display device.

[Drawing 13] It is the approximate line Fig. showing the example of a display in an example of the conventional image display device.

[Drawing 14] It is the approximate line Fig. showing the example of a display in an example of the conventional image display device.

[Drawing 15] It is the approximate line Fig. showing the example of a display in an example of the conventional image display device.

[Description of Notations]

4 [... Non-signal detecting element] ... A connection ID detecting element, 7 ... The image-processing section, 8 ... An additional information detecting element, 9
